Cow and quarter characteristics associated with teat dimensions: a longitudinal study

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Introduction. During the past 20 years, genetic selection has resulted in on average smaller teats in dairy cows. Nevertheless, it looks as if there is still considerable variation in teat sizes and shapes between cows in a herd. Still, cows within a herd are usually milked with the same teatcup liner. If the liner does not fit the teat properly, its main function to cyclically massage the teat will be strongly impaired, negatively influencing milking characteristics and udder health. Consequently, the liner choice is critical, and for a proportion of cows in a herd far from optimal. In a cross-sectional study (1), the level (herd, cow, quarter) at which most variation resides was determined and cow and quarter factors associated with teat dimensions were identified. However, the results needed to be confirmed in a longitudinal study assessing the evolvement of teat dimensions within cows over time.

Materials and methods. Teat length and diameters were determined using an objective 2D vision based measuring device developed at ILVO (2). During a monthly follow-up of one year, measurements were conducted on 8 well-managed commercial dairy herds. On 2 of the herds, all cows in lactation at the moment of the measurement participated in the study. On 6 herds, a cohort of 10 cows in each herd was selected at the beginning of the study. All teats were measured prior to milking. Cow- and quarter-related data (month, parity, lactation stage, milk production near test-day, quarter position) were added to the database. Linear mixed regression models were built with teat length and teat diameter at 75%, 50% and 25% of the total teat length, respectively, as dependent variables using SAS 9.3. The regression-model building process to identify risk factors involved several steps as previously described (3). Herd, cow and quarter were included as random effects to correct for clustering of cows within a herd, quarters within cows, and repeated measurements within quarters. The different potentially associated factors were included as fixed effects, including month to take into account the monthly measurements.

Results and discussion. Front teats are longer and slightly broader than hind teats. Teat length and diameters increase with parity, except for front teats, which do not significantly lengthen after the second parity. Within parities, teat length increases substantially after the first 30 days in milk with little change thereafter. Diameters generally decrease at the beginning of the lactation but depending on the diameter (75%, 50% or 25%) and the parity, continue to decrease or stabilise. A combination of factors might explain the variation in teat dimensions such as milk yield, age dependent or pregnancy related evolvement of the udder. Furthermore, the resolving of physiologic udder edema 2 to 4 weeks after calving may explain the significant change in teat dimensions. Since most of the variation in teat dimensions resides at the cow level, adapting the teatcup liner for parity and lactation stage could probably contribute to better teat condition and milking performances, eventually leading to better udder health.

References

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